

### **REMARKS**

Claims 1-40 are present in the application. In view of the remarks that follow, reconsideration is respectfully requested. On page 4 of the Office Action, the Examiner offers some comments in a "Response to Applicants' Argument" section. These comments are addressed in the remarks below.

#### **Request for Telephone Interview**

If the Examiner considers this Response and still believes that the claims are not allowable, **it is respectfully requested that the Examiner telephone the undersigned to schedule a telephone interview.**

#### **Independent Claim 1**

Independent Claim 1 stands rejected under 35 U.S.C. §103 as obvious in view of a proposed combination of Yang U.S. Patent No. 6,451,647 and Ying U.S. Patent No. 6,436,838. This ground of rejection is respectfully traversed. The PTO specifies in MPEP §2142 that:

The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.

Applicants respectfully submit that Yang and Ying fail to establish a *prima facie* case of obviousness under §103 with respect to Claim 1, for reasons discussed below.

THE PROPOSED COMBINATION DOES NOT YIELD THE CLAIMED SUBJECT MATTER

The provisions of MPEP §2142 specify with respect to §103 that:

To establish a *prima facie* case of obviousness . . . the prior art reference (or references when combined) must teach or suggest **all** the claim limitations. (Emphasis added).

Applicants' Claim 1 includes a recitation of:

etching through said exposed portions of said high k dielectric layer in an etch chamber with a plasma etch having a chemistry that includes a mixture of gases supplied to said chamber from externally thereof, said mixture of gases being free of oxygen gas (O<sub>2</sub>), and including an inert gas, BCl<sub>3</sub>, and one or more fluorocarbon gases C<sub>x</sub>H<sub>y</sub>F<sub>z</sub>, wherein x and z are integers and y is an integer or is 0, or CH<sub>4</sub>.

It is respectfully submitted that these limitations from Claim 1 are not met by combining the indicated teachings from Yang and Ying. More specifically, Yang teaches plasma etching a high-k dielectric material with an externally-supplied mixture that includes:

1. Oxygen gas (O<sub>2</sub>);
2. An inert gas; and
3. A fluorine-containing material.

Turning to Ying, the Office Action indicates that Ying teaches the use of barium trichloride, but Ying actually teaches the use of boron trichloride. (Applicants pointed out this same inconsistency in the remarks of their last Response, but it is noted that the error has not been

corrected, and still appears in the rejection). Ying teaches performing a plasma etch on a barium strontium titanate (BST) material, using an externally-supplied mixture that includes:

1. Boron trichloride ( $\text{BCl}_3$ ); and
2. A further gas (for example an inert gas, or oxygen gas).

In lines 16-18 on page 3, the Office Action asserts that it would be obvious to extract barium trichloride (i.e. boron trichloride) from the plasma chemistry taught by Ying, and then add it to the plasma chemistry of Yang. Doing this would result in a plasma chemistry that includes all of the following:

1. Boron trichloride ( $\text{BCl}_3$ , from Ying);
2. Oxygen gas ( $\text{O}_2$ , from Yang);
3. An inert gas (from Yang); and
4. A fluorine-containing material (from Yang).

As noted above, independent Claim 1 recites a plasma "chemistry that includes a mixture of gases supplied to said chamber from externally thereof, said mixture of gases being free of oxygen gas ( $\text{O}_2$ )". This is clearly different from the plasma resulting from the proposed combination of Yang and Ying (which includes oxygen gas intentionally supplied from externally of the chamber).

On page 4 of the Office Action, in the "Response to Applicants' Arguments" section, the Examiner offers the following comments:

Applicants' argument concerning the gas content of the plasma is noted. However, the combination of references does teach . . . oxygen gas to be an alternative and not needed. The references still teach and read on all limitations of the instant claims. Since, both references etch the same materials, and one teaches oxygen as an alternative. It therefore . . . is within the skill of the art to not include the oxygen.

However, Applicants respectfully note that the entire point of the Examiner's argument here is not consistent with the specific §103 rejection presented in the Office Action. In particular, the §103 rejection of Claim 1 is set forth from line 17 on page 2 through line 6 on page 3 of the Office Action. This §103 rejection proposes a very simple modification to Yang in view of Ying. More specifically, the §103 rejection merely asserts that it would be obvious to take boron trichloride from Ying's plasma and add it to Yang's plasma. In contrast, in the above-quoted comments from page 4 of the Office Action, the Examiner proposes an additional modification to Yang that is not part of the actual §103 rejection. More specifically, in addition to taking boron trichloride from Ying's plasma and adding it to Yang's plasma, the Examiner proposes the additional change of removing oxygen from Yang's plasma in view of teachings in Ying. But since the §103 rejection itself does not say anything about removing oxygen, the Examiner's comments about removing oxygen on page 4 are completely irrelevant to the actual §103 rejection being applied to Claim 1.

For the reasons discussed above, it is respectfully submitted that, even when the indicated teachings from Yang and Ying are combined in the proposed manner, they fail to satisfy the requirement of MPEP §2142 that their combined teachings must collectively "teach or suggest all the claim limitations" (emphasis added). Therefore, for this independent reason alone, it is respectfully submitted that Claim 1 is not obvious under §103 in view of Yang and Ying, and notice to that effect is respectfully requested.

#### NO VALID REASON IS GIVEN FOR MODIFYING YANG IN VIEW OF YING

It is well-established that, in any §103 rejection, each proposed modification to the primary reference must be accompanied by a statement of a reason why a person skilled in the art would be motivated to make that particular modification. For example, MPEP §2142 specifies that:

To establish a *prima facie* case of obviousness, . . . there must be some suggestion or motivation, either in the references themselves

or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.

In lines 4-6 on page 3 of the present Office Action, the Examiner asserts that the reason a person of ordinary skill would have been prompted to take boron trichloride from the plasma of Ying and add it to the plasma of Yang is "to increase the selectivity of the etchant gases". In lines 38-40 of column 7 and lines 46-47 of column 8, Ying teaches that, with  $\text{BCl}_3$ , the selectivity of PZT to TiN is very good. Aside from this, Ying does not appear to discuss how  $\text{BCl}_3$  affects selectivity. Turning to Yang, it does not appear that Yang mentions etching of TiN, much less with respect to PZT. Since Yang does not appear to involve an issue of etching PZT with respect to TiN, it is not clear that adding  $\text{BCl}_3$  to the plasma of Yang would actually "increase the selectivity of the etchant gases" in Yang. Accordingly, the Office Action does not offer any valid reason why a person with only ordinary skill in the art would be prompted to make the particular modification to Yang that is proposed by the Examiner. On page 4 of the Office Action, the Examiner attempts to cure this defect, stating that:

Applicants' argument concerning the motivation to combine references has been considered and not deemed persuasive. The examiner has provide[d] a clear line of reasoning and motivation to combine references. The combination of know[n] materials that perform the same function is obvious as set forth in the MPEP. The examiner has meet [sic] the requirements for a proper rejection as set forth by the courts.

However, the sentences in this paragraph are all generic, conclusory statements that do not relate to or discuss the specific technology and facts involved in the present §103 rejection. Moreover, the statement about the obviousness of combining known materials that perform the same function is not relevant here. In particular, as noted above, the reason given for adding boron trichloride to Yang's plasma is that Ying teaches boron trichloride will increase selectivity. But as also discussed above, Ying teaches merely that boron trichloride will increase selectivity

as between PZT and TiN. Aside from this, Ying does not appear to discuss how BCl<sub>3</sub> affects selectivity. Turning to Yang, it does not appear that Yang mentions etching of TiN, much less with respect to PZT. And if Yang is not performing an etching that involves both PZT and TiN, then there is no basis for the assertion in the Office Action that Yang's plasma and Ying's plasma are both performing the same function.

As discussed above, the present Office Action asserts a reason why the skilled person might possibly modify Yang by adding boron trichloride to Yang's plasma. But the §103 rejection on pages 2-3 does not offer any additional reason as to why a person skilled in the art might be motivated to make the additional modification of removing oxygen from Yang's plasma. The Examiner does assert on page 4 that it "is within the skill of the art to not include the oxygen". However, this statement is not part of the actual §103 rejection on pages 2-3. Moreover, it is well established that examiners may not properly establish the motivation needed for a prima facie case of obviousness by merely asserting that a modification is "within the skill of the art". For example, MPEP §2143.01 emphasizes that the:

FACT THAT THE CLAIMED INVENTION IS WITHIN THE  
CAPABILITIES OF ONE OF ORDINARY SKILL IN THE ART  
IS NOT SUFFICIENT BY ITSELF TO ESTABLISH *PRIMA*  
*FACIE* OBVIOUSNESS

A statement that modifications of the prior art to meet the claimed invention would have been " 'well within the ordinary skill of the art at the time the claimed invention was made' " because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. [Case citations

omitted] . . . (The level of skill in the art cannot be relied upon to provide the suggestion to combine references).

As emphasized in MPEP §2142, if a §103 rejection does not identify any valid reason that would prompt each proposed modification, then the rejection fails to meet one of the minimum requirements needed to properly establish a prima facie case of obviousness. In the present situation, it is respectfully submitted that there is no valid reason that would prompt a person of ordinary skill to modify Yang in the proposed manner in light of Ying. Accordingly, Claim 1 is not rendered obvious under §103 by Yang and Ying. Claim 1 is therefore believed to be allowable, and notice to that effect is respectfully requested..

#### Independent Claim 20

Independent Claim 20 stands rejected under 35 U.S.C. §103 as obvious in view of a proposed combination of Yang and Ying. This ground of rejection is respectfully traversed. Claim 20 includes a recitation of:

etching through exposed portions of said high k dielectric layer in an etch chamber with a plasma etch having a chemistry that is includes a mixture of gases supplied to said chamber from externally thereof, said mixture of gases being free of oxygen gas (O<sub>2</sub>), and including an inert gas, BCl<sub>3</sub>, and one or more fluorocarbon gases C<sub>x</sub>H<sub>y</sub>F<sub>z</sub>, wherein x and z are integers and y is an integer or is 0, or CH<sub>4</sub>.

The rationale given in the Office Action for the rejection of Claim 20 is identical to the rationale given for the rejection of Claim 1. Therefore, for the same basic reasons discussed above in association with Claim 1, it is respectfully submitted that (1) the proposed modification of Yang

in view of Ying does not result in the particular plasma chemistry recited in Claim 20, and (2) there is no valid reason that would prompt a person of ordinary skill in the art to make the proposed modification to Yang in view of Ying. Accordingly, the proposed modification would not be obvious under §103. Claim 20 is therefore believed to be allowable.

#### Dependent Claims

Claims 2-19 and Claims 21-40 respectively depend from Claim 1 and Claim 20, and are also believed to be distinct from the art of record, for example for the same reasons discussed above with respect to Claims 1 and 20.

#### Conclusion

Based on the foregoing, it is respectfully submitted that all of the pending claims are fully allowable, and favorable reconsideration of this application is therefore respectfully requested. If the Examiner believes that examination of the present application may be advanced in any way by a telephone conference, the Examiner is invited to telephone the undersigned attorney at 972-739-8647.

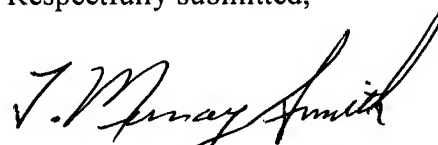


Appl. No. 10/688,045  
Reply to Office Action of October 4, 2007

Attorney Docket No. 2003-0065 / 24061.508  
Customer No. 42717

Although Applicants believe that no fee is due in association with the filing of this Response, the Commissioner is hereby authorized to charge any additional fee required by this paper, or to credit any overpayment, to Deposit Account No. 08-1394 of Haynes and Boone LLP

Respectfully submitted,

A handwritten signature in black ink, appearing to read "T. Murray Smith", written over a horizontal line.

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Enclosures: None

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